ment to provide stabilization. These legs **52** can include three dorsally and three volarly, and then one both radially and ulnarly. Other numbers of legs **52** are also possible. These legs **52** have a radially outward curvature, which essentially come out of the drilled hole where the shell **30** has been placed and again, grab onto the tissue structures. The legs **52** can have teeth **54** on them that would help facilitate holding the soft tissue and olecranon. The use of a shell **30** with legs **52** minimizes the need for hardware removal. Currently, hardware removal is usually necessary with many fixation systems because of the discomfort experienced by patients of having an object between the olecranon and proximal ulna and the skin when they place any pressure on it. The olecranon fracture fixation system **10** would be locked and would be essentially within the bone and soft tissues, that it would not be palpable and would not require removal at a later date. Also, if the surgeon felt the need to go ahead and tension band, this option is still available for the surgeon to perform without compromising the olecranon fracture fixation system **10** in any fashion. Different types of legs **52** for the olecranon fracture fixation system **10** could be designed, i.e. in amount of bend, amount of lengths, amount of stiffness, and type of gripping surfaces. The leg technology on this olecranon fracture fixation system **10** may be applicable to other fracture types such as patella fractures, greater trochanteric fractures, and even potentially femur fractures.

Looking at FIGS. **5** and **6**, there is shown another example embodiment of an olecranon fracture fixation system **60** according to the invention. The olecranon fracture fixation system **60** is a different intramedullary design, but for similar types of fractures. The olecranon fracture fixation system **60** includes a distal generally cylindrical intramedullary core **62**. The intramedullary core **62** on the proximal end **63** has an internally threaded bore **64**. Derotational outwardly extending longitudinal fins **66** on the intramedullary core **62** help prevent the core **62** from rotating in the intramedullary canal **26**. The intramedullary core **62** also has windows **68** that allow for 2.3 millimeter locking screws **70** to pass through the ulna **16**.

The olecranon fracture fixation system **60** also includes a hollow proximal shell **72** having loop wires **74** that come out from an outer proximal end **76** of the shell **72**. The loop wires **74** are configured in almost a four-leaf clover pattern. See FIG. **6**. Other numbers of loops are also possible. The loop wires **74** grab the triceps tendon and olecranon fracture fragment to provide stabilization. Derotational suture holes **77** formed by coiling a section of the wire of the loop wires **74** are also provided. The suture holes **77** allow the surgeon to weave suture through the suture holes and through the triceps tendon if needed. The use of a shell **72** with loop wires **74** minimizes the need for hardware removal. Currently, hardware removal is usually necessary with many fixation systems because of the discomfort experienced by patients of having an object between the olecranon and proximal ulna and the skin when they place any pressure on it. The olecranon fracture fixation system **60** would be locked and would be essentially within the bone and soft tissues, that it would not be palpable and would not require removal at a later date. Different types of loop wires **74** for the olecranon fracture fixation system **60** could be designed, i.e. in amount of bend, amount of lengths, amount of stiffness, and type of gripping surfaces. The loop wire technology on this olecranon fracture fixation system **60** may be applicable to other fracture types such as patella fractures, greater trochanteric fractures, and even potentially femur fractures. Also, the loop wires could be formed by a manufacturing process such as a mold technique, and then the suture holes **77** could be formed by machining through the metal.

The central part of the olecranon fracture fixation system **60** is a compression screw **78** that is inserted across the fracture line **23**. This allows the surgeon to compress the fracture as needed. Threads **88** of the compression screw **78** engage the threaded bore **64** of the intramedullary core **62**. The head **82** of the compression screw **78** engages an inwardly directed flange **83** of the distal end of the shell **72**. An insertion arm device (similar to insertion arm **46**) can be used to insert the shell **72** and place compression screw **78**.

The olecranon fracture fixation system **60** also includes a first locking screw **84** and a second locking screw **89**. The first locking screw **84** is inserted in the proximal to distal direction and passes through the shell **72** and the olecranon **20**. The first locking screw **84** engages the head **82** of the compression screw **78** and a loop wire **74** after the shell **72** is attached to the core **62**. The first locking screw **84** prevents the compression screw **78** from backing out. The second locking screw **89** is inserted in the distal to proximal direction and passes through the shell **72** and the olecranon **20**.

The components of the olecranon fracture fixation system **10** and the olecranon fracture fixation system **60** may be formed from various materials such as, without limitation: (i) a metal or metal alloy such as a titanium alloy (e.g., titanium-6-aluminum-4-vanadium), a cobalt alloy, a stainless steel alloy, or tantalum; (ii) a nonresorbable ceramic such as aluminum oxide or zirconia; (iii) a nonresorbable polymeric material such as polyethylene; or (iv) a nonresorbable composite material such as a carbon fiber-reinforced polymers (e.g., polysulfone).

Although the present invention has been described in detail with reference to certain embodiments, one skilled in the art will appreciate that the present invention can be practiced by other than the described embodiments, which have been presented for purposes of illustration and not of limitation. Therefore, the scope of the appended claims should not be limited to the description of the embodiments contained herein.

What is claimed is:

1. A fracture fixation system for a bone having a fracture line between a central section of the bone and an end section of the bone, the system comprising:

- an intramedullary core dimensioned for insertion in an intramedullary canal of the bone;
- a hollow shell dimensioned for insertion in the intramedullary canal of the bone, the shell including a plurality of fixation elements that extend outwardly away from a proximal end of the shell; and
- a fastener for attaching the shell to the core in the intramedullary canal,
- wherein the fixation elements extend away from the fracture line of the bone when the core and shell are inserted in the intramedullary canal, and
- wherein the fixation elements engage an end surface of the end section of the bone and/or tissue covering the end surface of the end section of the bone when the core and shell are attached in the intramedullary canal, and
- wherein the fixation elements extend axially and radially away from the proximal end of the shell, and
- wherein the fastener transversely engages the core and the shell, and the fastener is configured to directly contact the bone for attaching the core in the intramedullary canal, and